



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/930,322	08/15/2001	Gregory F. Welch		3587

7590 02/11/2004

Patent Department
Mitsubishi Electric Research Laboratories, Inc.
201 Broadway
Cambridge, MA 02139

EXAMINER

WALLACE, SCOTT A

ART UNIT	PAPER NUMBER
----------	--------------

2671

DATE MAILED: 02/11/2004

3

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/930,322

Applicant(s)

WELCH ET AL.

Examiner

Scott Wallace

Art Unit

2671

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13 and 15-18 is/are rejected.
- 7) ☒ Claim(s) 12, 14 and 19 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2</u> . | 6) <input type="checkbox"/> Other: ____. |

Claim Objections

1. Claim 4 is objected to because of the following informalities: Claim 4 says "illuminating the 3D physical object with the 3D physical object". However, claim 1 says illuminating the 3D object with the image. Which is correct? Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claim 13 recites the limitation "corrected plurality of images". Claim 1 does not disclose a plurality of images. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
2. Claims 1, 3-4, 6-11, 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura et al., U.S. Patent No. 5,936,628 in view of Lake et al., U.S. Patent No. 6,593,924 in view of Oosawa, U.S. Patent No. 6,636,627 in view of Stegmann et al, U.S. Patent No. 6,415,050.
3. As per claim 1, Kitamura et al discloses a method for animating a 3D physical object (column2 lines 54-56), comprising: acquiring a 3D graphics model of the 3D physical object (column 1 lines 10-15); editing the 3D graphics model with graphics authoring tools to reflect a desired appearance of the 3D physical object (column 1 lines 10-15). However, Kitamura et al does not disclose rendering the virtual 3D

graphics model as an image considering a user location and a location of a virtual light. This is disclosed in Lake et al in column 10 lines 15-30. It would have been obvious to one of ordinary skill in the art at the time the invention was made to consider the user and light location when rendering the image because this would add to the realism of the image by having it look like a real object looks from a certain angle and how it looks when it is lighted. Also Kitamura et al does not disclose correcting intensity values of the image according to an orientation of a surface of the object and a radiance at the surface. This is disclosed in Oosawa in column 11 lines 14-27. It would have been obvious to one of ordinary skill in the art to correct the intensity values because this would give the image when a more natural look. Also, Kitamura et al does not disclose illuminating the 3D physical object with the corrected image to give the 3D physical object the desired appearance under the virtual light when viewed from the user location. This is disclosed in Stegmann et al in column 1 lines 5-27. It would have been obvious to one of ordinary skill in the art to illuminate an object with an image because this would allow representation of the object from different perspectives.

4. As per claim 3 Kitamura et al discloses storing the 3D graphics model in a computer memory as a triangle mesh model entirely specified by connected vertices and orientations of the vertices (column 6 lines 37-44).

5. As per claim 4, Stegmann et al discloses registering a projector illuminating the 3D physical object with the 3D physical object (column 1 lines 5-28).

6. As per claim 6, it is well known wherein the editing is interactive by applying a hand-held virtual paint brush tool directly to the 3D physical object.

7. As per claim 7, it would be obvious to one skilled in the art to track the locations of a moving user because the references looks at objects from different viewpoints so knowing the locations would be needed when rendering the model.

8. As per claim 8, It would be obvious to track the moving user with a stereo-sensor because this would give a more accurate location of the user.

9. As per claim 9, it is well known to use separate transformation matrices for the projector and shading parameters that are dependent on the user location. These transformations are used to change projector angle.

10. As per claim 10, it is well known that intensity values can be corrected using alpha-blending of a rendering engine.

11. As per claim 11, it is well known that the object can include arbitrarily shaped surfaces oriented at various angles.

12. As per claim 15, Kitamura et al discloses wherein the desired appearance simulates a rotation of the 3D physical object (column 2 lines 54-56, the animation can be rotating).

13. As per claim 16, Stegmann et al discloses wherein the projector is a steerable laser (column 3 lines 29-31).

14. As per claim 17, it is well known that the projector could digital.

15. As per claim 18, Kitamura et al discloses a method for animating a 3D physical object (column 2 lines 54-56), comprising: acquiring a 3D graphics model of the 3D physical object (column 1 lines 10-15); editing the 3D graphics model to reflect a desired appearance of the 3D physical object (column 1 lines 10-15); defining a user location and modifying the edited 3D graphics model based on the user location (this is obvious because every time the user changes location the view is different and therefore has to be modified). However, Kitamura et al does not disclose rendering the virtual 3D graphics model as an image considering a user location. This is disclosed in Lake et al in column 10 lines 15-30. It would have been obvious to one of ordinary skill in the art at the time the invention was made to consider the user and light location when rendering the image because this would add to the realism of the image by having it look like a real object looks from a certain angle and how it looks when it is lighted. Also Kitamura et al does not disclose correcting intensity values of the image according to an orientation of a surface of the object and a radiance at the surface. This is disclosed in Oosawa in column 11 lines 14-27. It would have been obvious to one of ordinary skill in the art to correct the intensity values because this would give the image when a more natural look. Also, Kitamura et al does not disclose approximately positioning a projector; determining the pose of the projector with respect to the 3D physical object; and projecting the

corrected image on the 3D physical object. This is disclosed in Stegmann et al in column 1 lines 5-27. It would have been obvious to one of ordinary skill in the art to project onto the 3D object because this would allow animation and other effects to be done.

16. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura et al., U.S. Patent No. 5,936,628 in view of Lake et al., U.S. Patent No. 6,593,924 in view of Oosawa, U.S. Patent No. 6,636,627 in view of Stegmann et al, U.S. Patent No. 6,415,050 in further in view of Davison et al., U.S. Patent No. 6,516,099.

17. As per claim 2, Kitamura, Lake, Oosawa and Stegmann fail to disclose scanning the 3D physical object with a 3D touch probe sensor to acquire the 3D graphics model. This is disclosed in Davison et al in column 1 lines 5-21. It would have been obvious to one of ordinary skill in the art to use a touch sensor because these would give accurate depictions of the object.

18. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura et al., U.S. Patent No. 5,936,628 in view of Lake et al., U.S. Patent No. 6,593,924 in view of Oosawa, U.S. Patent No. 6,636,627 in view of Stegmann et al, U.S. Patent No. 6,415,050 in view of Reinhardt et al., U.S. Patent No. 6,281,904.

19. As per claim 5, Kitamura, Lake, Oosawa and Stegmann fail to teach editing view-independent texture and view-dependent material characteristics of the 3D graphics model to reflect the desired appearance. This is disclosed in Reinhardt et al in column 12 lines 34-44. It would have been obvious to one of ordinary skill in the art at the time the invention was made to edit textures because this would eliminate artifacts from specular lighting.

Allowable Subject Matter

20. Claims 12, 14 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Scott Wallace** whose telephone number is **703-605-5163**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Mark Zimmerman**, can be reached at 703-305-9798.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.


MARK ZIMMERMAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600